

Work Order ID 136053

Friday, August 28, 2015 1:54:44 PM

136053

Page 1

Item ID: D407-667-205 REPAIR

Accept

N900040100

Setup Start *NS1*

Revision ID:

Item Name: Aft Crosstube - High 407

Stop *NS2*

Start Date: 8/27/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/28/2015 Req'd Qty: 1.00

1

Customer: CEDWA0

Reference: RMA RA112134-1

Approvals: Process Plan: MF Date: 15-8-28

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

N/A	
D407-667-205	CHG008
Crosstube Aft High	SH01-5
B108433	SR01304NY
Bell 407	

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
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100

0.00

100

QC

Quality Control

Memo

0.00

INSPECT RA 112134-1

D407-667-205 X 1 B108433

TR B 107536

-CROSSTUBE WAS REMOVED FROM AIRCRAFT N417AM WITH 528 HOURS AND 3864 LANDINGS

-CORROSION FOUND ON EDGE OF CROSSTUBE AND D2894-1, D3190-1, MS210920-22& MS21920-25

-DAMAGE ON D3190-1

-CHAFING SHIELD INSTALLED AS PER REV F

-CROSSTUBE HAS BEEN REPAINTED BY CUSTOMER

REWORK CROSSTUBE PER RS1028

ID AND STOCK AS D407-667-205 REPAIR (CHG 009)

110

0.00

110

Crosstubes

Crosstubes

Memo

0.00

DAS
41
9-89

15-11-15

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%; border: none;"> <tr> <td style="border: none;">Skid-tube ☐</td> <td style="border: none;">Cross tube ☐</td> <td style="border: none;">Water Jet ☐</td> <td style="border: none;">Engineering ☐</td> </tr> <tr> <td style="border: none;">Machining ☐</td> <td style="border: none;">Small Fab ☐</td> <td style="border: none;">Prod. Eng. Coord. ☐</td> <td style="border: none;">Quality ☐</td> </tr> <tr> <td style="border: none;">Thermoforming ☐</td> <td style="border: none;">Finishing ☐</td> <td style="border: none;">Rec/Store/Packaging ☐</td> <td style="border: none;">Other ☐</td> </tr> <tr> <td style="border: none;">Large Fab ☐</td> <td style="border: none;">Composite ☐</td> <td style="border: none;">Supplier ☐</td> <td></td> </tr> </table>				Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																																	
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OTHER :																																																																					

Work Order ID 136053

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136053

Page 2

Item ID: D407-667-205 REPAIR

Accept

N900040100Setup Start ***NS1***

Revision ID:

Item Name: Aft Crosstube - High 407

Stop ***NS2***

Start Date: 8/27/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/28/2015 Req'd Qty: 1.00

1

Customer: CEDWA01

Reference: RMA RA112134-1

Approvals:

Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start ***NR1***

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop ***NR2***Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool # Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

120

QC5- Inspect part completeness to step on W/O

0.00

120

QC

Memo

0.00

Quality Control

NOV 16 2015

130

Identify as per dwg & Stock Location: 09A

0.00

130

Packaging

Memo

0.00

Packaging

NOV 18 2015

140

QC21- Final Inspection - Work Order Release

0.00

140

QC

Quality Control

BEFORE GRIND
BLADE mic ultra
b b

0.00

AFTER GRIND
BLADE ultra
b ↓

ML5 15-11-20

JH 20151115

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition			
				Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
OTHER : ☐					

Picklist Print

Friday, August 28, 2015 1:54:39 PM

Page 1
4

Work Order ID: 136053

136053

Parent Item: D407-667-205 REPAIR

D407-667-205 REPAIR

Parent Item Name: Aft Crosstube - High 407

Start Date: 8/27/2015

Required Date: 8/28/2015

Start Qty: 1.00

Required Qty: 1.00

Comments:

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-205 REPAIR		Manufactured	No				Each	0.0000		1			

D407-667-205 REPAIR

Aft Crosstube - High 407

1x 108433 MF
15-8-28

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation			Disposition		
			Completed By		
			Lead hand / Supervisor Approval Verification		
			QC / QA Coordinator Approval		
Root Cause		FAULT CATEGORY			
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐
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Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐
Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____			
Misidentified ☐	Past Due ☐				

RA112134-1

Received @ August 26, 2015
Inspected @ August 27, 2015

CUSTOMER: BELL CHERON
CUSTOMER CONTACT: ALAIN LOUPE
SHIPPED FROM: PINEY FLATS, TENNESSEE USA

Instructions for RA112134-1 D407-667-205 B108433 CHG 008

- D407-667-205 was sent for repair
- Crosstube was removed from aircraft N417AM with 528 hours and 3864 landings
- Inspection findings
 - Corrosion found on edge of crosstube and D2894-1, D3190-1, MS21920-22 and MS21920-25
 - Damage on D3190-1
 - Chaffing shield is install as per rev f
 - Crosstube has been repainted by customer
- Re work D407-667-205 as per RS1028
- Identify as D407-667-205 CHG 009 (repair) with new batch number and ship back to customer

Time Estimate: Min 60 hours

Departments Required: quality, crosstube, finishing

Pictures Attached: yes

QTY INSPECTED: D407-667-205 B108433 CHG 008

**THIS INSTRUCTION SHEET MUST
BE ATTACHED TO THE
RESTOCKING WORK ORDER AT
ALL TIMES!!!!**

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval	
Description Work Order Deviation		Disposition			

Root Cause				FAULT CATEGORY			
Environment ☐	☐	No Re-verification ☐	☐	Pressure/Forced ☐	☐	Temperature/Cure ☐	☐
Design ☐	☐	Operator ☐	☐	Bending ☐	☐	Set-up ☐	☐
Doc/Data ☐	☐	Offset/Setup ☐	☐	Centre Not Concentric ☐	☐	BOM/Route ☐	☐
Equip/Tooling ☐	☐	Supplier ☐	☐	Cracks ☐	☐	Broken/Damage/Defect ☐	☐
Handling/Pre ☐	☐	Training ☐	☐	Crimp/Kink/Ripple/Wave ☐	☐	Inspection Incomplete/Unqualified ☐	☐
Material ☐	☐	Use for Testing ☐	☐	Cuffs ☐	☐	Contamination ☐	☐
Internal Transport ☐	☐	Poor Information ☐	☐	Crushing ☐	☐	Countersink ☐	☐
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Substation ☐	☐	Process Improvement ☐	☐	Marks/Chatter ☐	☐	Drill Holes ☐	☐
Past Expiry Date ☐	☐	Manufacturing Process ☐	☐	OTHER : _____			
Misidentified ☐	☐	Past Due ☐	☐				

DART AEROSPACE LTD	Work Order:	136053
Description: Corrosion in center of cross tube		
Drawing: D407-667-245	Repair Scheme:	RS1028
Part No: D407-667-205 Aft Crosstube	Page:	1 of 2
Batch No: B _____	Qty:	1

Step	Location	Procedure	By	Date	Qty
1	Quality Assurance	Inspect Condition of RA112134-1 D407-667-205 B108433 ALL WORK TO BE CARRIED OUT AS PER ICA - Removed from <u>AC 0417 AM</u> - Original removal tag attached to work order - D407-667-205 will be rework as per ICA-D206-667-1 Check the following POOR / USED ☐ DAMAGED / USED ☐ CORRODED / USED ☒ NEW ☐	DAS 9 9-89	15-08-28	①
2	Finishing / Crosstube assembly	Remove the following hardware from tube - D2894-1 Support B <u>10395</u> clean off all Scotch-Weld & clean support entirely and tag to be reinstalled on the cross tube - Discard all MS21920-25 M _____ x2 & ✓ D3595-063-450 B _____ x2 ✓ - MS21920-22 M _____ x4 and discard ✓ - Remove D3190-1 B _____ x2 and Discard ✓	DAS 41 9-89	15-8-31	①
3	Finishing / Crosstube assembly	Strip paint and primer. P/O: <u>29714</u>	CX	SEP 08 2015	1
4	QC 15 Quality Control	Measure all dimensions as per DWG / ICA & fill out on the crosstube dimension sheet	5	15/07/18	
5	Landing Gear / Crosstube	<u>BUFF OUT ALL CORROSION AND MARKS WITHIN ACCEPTABLE LIMITS AS INSTRUCTED IN THE ICA</u>	JW	15-09-24	
6	Landing Gear / Crosstube	Perform ultrasonic measurements in the locations from the original work order D407-667-205TRN B _____ and at location where corrosion was found Fill out wall thickness measurement FAI	JW	15-09-24	
7	QC 5 Quality Control	Inspect work to current step	DAS 9 9-89	15-09-25	
8	Finishing	Alodine as per QSI005 4.1	JW/R	15-09-24	
9	QC 7 Quality Control	Inspect alodine finish as per QSI 005 & QSI 012	DAS 9 9-89	15-09-25	
10	Finishing / Crosstube Assembly	Prime as Per QSI 005 4.2 Tempo 4500-PB-23Y-BG B# <u>132384</u> Exp. Date # <u>8/16</u> clear <u>132664</u> Paint <u>132896</u>	DAS 41 9-89	15-10-13	1
11	QC 14 Quality Control	Inspect finish of tube	DAS 38 9-89	NOV 16 2015	1

h2 234
TS: 92.66
C' 533°
535°

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
OTHER : _____					

DART AEROSPACE LTD		Work Order:	
Description: Corrosion in center of cross tube			
Drawing: D407-667-245		Repair Scheme:	RS1028
Part No: D407-667-205 Aft Crosstube		Page:	2 of 2
Batch No: B _____		Qty:	1

Step	Location	Procedure	By	Date	Qty
12	Finishing / Crosstube assembly	Reinstall as per DWG Install Chafing Shield as per D407-667-245 rev G. Ensure that the overlapping edge of the chafing shield is located at approximately 60° from bottom vertical to prevent deterioration of the rubber bumpers. Be sure to eliminate any air gaps. D3190-1-x2 B# <u>137155</u> MS21920-22-x4 M# <u>133483</u> A/R Proseal 890 B# <u>133071</u> Exp.: <u>2/16</u> Lightly Scuff the bonded are using 320 grit sand paper and clean area with 41058 was 'n' wipe. Install original D2894-1 using Scotch-Weld DP460 and install clamps as per DEO D407-667-245 using installation jig DT9025. Torque clamps as per Dwg A/R Scotch-Weld DP460 B# <u>132895</u> Exp.: <u>8/16</u> MS21920-25-x2 M# <u>133336</u> D3595-063-450-x2 B# <u>136574</u>	DAS 41 9-89	15-11-11	1
13	QC 5 Quality Control	Re-inspect locations for Installed hardware as per Dwg Re-inspect Torque of clamps to 80-100 IN-LB	DAS 38 9-89	NOV 16 2015	DAS 38 9-89
14	Stores / Packaging	Pick kit AN5-10A M# <u>11133077</u> x10 AN5-34A M# <u>11133363</u> x4 AN5-32A M# <u>132536</u> x4 MS21042L5 M# <u>132677</u> x4 NAS11490-0563J M# <u>132677</u> x18 Had in new paper work And new label with identification as USED/REPAIR part	 DAS 28 9-89	NOV 17 2015	1
15	QC 4 Quality Control	Inspect Kit for completeness and ensure labels are correct	DAS 28 9-89	NOV 17 2015	1
16	Packaging	Identify & Stock as USED	DAS 28 9-89	NOV 30 2015	
17	Quality Control	QC21		NOV 30 2015	

Rev	Date	Change Description	Prepared	Checked	Approved
B	15.07.24	New Issue	PD		

U:\Admin\Forms\Repairschemb\A.doc

Rev. B

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

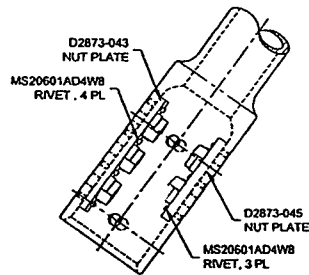
Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition		Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval	
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
		OTHER : _____			

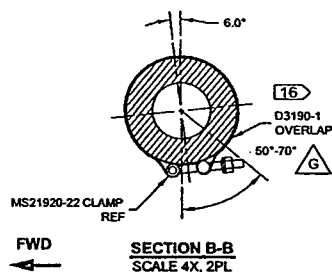
REFERENCE ONLY

D407-667-605

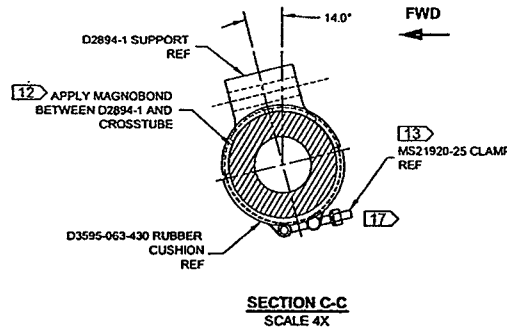
D407-667-245
ASSEMBLY DETAIL
(VIEW LOOKING FWD)



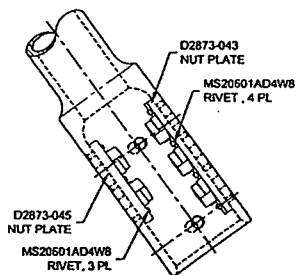
VIEW A-A CUFF DETAIL
SCALE 4X



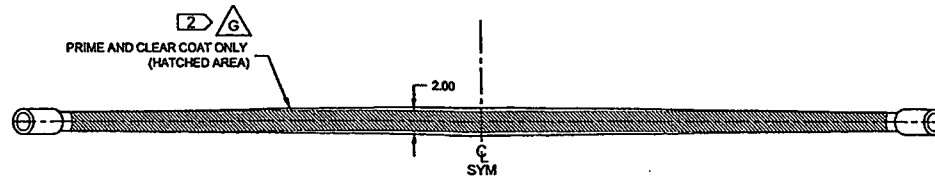
SECTION B-B
SCALE 4X, 2PL



SECTION C-C
SCALE 4X



VIEW D-D CUFF DETAIL
SCALE 4X



RELEASED
2015 APR 09

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. G
MFG. APPR.	RF	D407-667-245	SHEET 2 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	15.03.20	COPYRIGHT © 2002 BY DART AEROSPACE LTD	
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE, OR COPIED OR REPRODUCED IN ANY MANNER WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.			

Location	Before dimension	After dimension	Accept	Reject	Methode of inspection
----------	------------------	-----------------	--------	--------	-----------------------

A					blade mic
B					blade mic
C					ultra sound
					ultra sound
					ultra sound
					ultra sound
D					blade mic
E					blade mic
F					ultra sound
					ultra sound
					ultra sound
					ultra sound
G					blade mic
H					blade mic
I					ultra sound
					ultra sound
					ultra sound
					ultra sound

measured by:
date:

inspected by:
date:



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO29714**

Purchase Order Date 9/8/2015

PO Print Date 9/8/2015

Page Number 1 of 2

Order From :

VC-IMI001

Ship To : DART AEROSPACE LTD

IMI MANUFACTURING INC.
772 MAIN ST. E.P.O. BOX 3
HAWKESBURY, ON K6A 2R4
CA

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

FAKED

Contact Name

Vendor Phone

613 675 1208 Ext.223

Buyer

Chantal Lavoie

Customer POID

Customer Tax #

10127-2607

Terms

Net 30

Currency

CAD

FOB

Destination-Collect

Ship To Contact

Ship To Phone

Ship Via:

Ship Acct:

Line Nbr	Reference Vendor Part Number Line Comments Delivery Comments	Description/ Mfg ID	Req Date/ Taxable Promise Date	CD	Req Qty/ Unit of Measure	PO Unit Price	Extended Price
1	135115	D407-667-205 CROSSTUBE	9/11/2015 Yes 9/11/2015		1.00	\$0.00	\$0.00
To cover the cost of pain stripping. Strip product supplied.							
Line Total:							\$0.00
2	135863	D407-667-205 CROSSTUBE	9/11/2015 Yes 9/11/2015		1.00	\$0.00	\$0.00
To cover the cost of pain stripping. Strip product supplied.							
Line Total:							\$0.00

PO Instructions: PROCUREMENT QUALITY CLAUSES
A000 CLAUSES NOT REQUIRED

Note:

9/8/2015



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO29714**

Purchase Order Date 9/8/2015

PO Print Date 9/8/2015

Page Number 2 of 2

Order From :

IMI MANUFACTURING INC.
772 MAIN ST. E.P.O. BOX 3
HAWKESBURY, ON K6A 2R4
CA

VC-IMI001

Ship To : DART AEROSPACE LTD
1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name
Vendor Phone

613 675 1208 Ext.223

Buyer

Chantal Lavoie

Customer POID

Customer Tax #

10127-2607

Terms

Net 30

Currency

CAD

FOB

Destination-Collect

Ship To Contact

Ship To Phone

Ship Via:

Ship Acct:

3

136053

D407-667-205
CROSSTUBE

9/11/2015

1.00

\$0.00

\$0.00

Yes

9/11/2015

To cover the cost of pain stripping.
Strip product supplied.

Line Total:

\$0.00

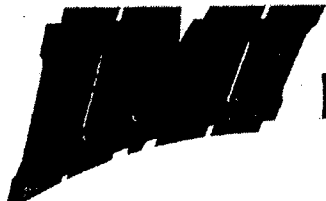
PO Total:

\$0.00

PO Instructions: PROCUREMENT QUALITY CLAUSES
A000 CLAUSES NOT REQUIRED

Note: Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Change Date: 9/8/2015



Manufacturing Inc.

2056 County Rd #4, L'Original, Ontario K0b 1K0

Phone 613-675-1208

Fax 613-675-1250

PACKING SLIP

Date : Sept 17 /2015

TO : DART AEROSPACE
1270 Aberdeen Street
Hawkesbury ON
K6A 1K7

SALESPERSON:		JOB #	PO NUMBER :	
		15-0383-22	29714	
QTY ORDER	DESCRIPTION		QTY SHIP	LINE TOTAL
1	Decaper tuyaux (CROSSTUBE) <i>15/9/17 SP</i>		1	

Client: (PRINT NAME) _____ (SIGNATURE) _____

THANK YOU FOR YOUR BUSINESS!

Location	Before dimension	After dimension	Accept	Reject	Method of inspection
----------	------------------	-----------------	--------	--------	----------------------

A	0.478	0.499			blade mic <i>ultra</i>
B	2.403	2.435			blade mic
B	0.579	0.627			ultra sound
	2.615	2.661			ultra sound <i>Blade</i>
C	0.524	0.569			ultra sound
	2.501	2.541			ultra sound <i>Blade</i>
D	0.675	0.670			blade mic <i>ultra</i>
E	2.749	2.741			blade mic
E	0.667	0.606			ultra sound
	2.749	2.681			ultra sound <i>Blade</i>
F	0.660	0.665			ultra sound <i>Blade ULTRA</i>
	2.750	2.607			ultra sound <i>Blade</i>
G	0.578	0.558			blade mic <i>ultra</i>
H	2.612	2.538			blade mic
H	0.488	0.458			ultra sound
	2.400	2.351			ultra sound <i>Blade</i>
I	0.533	0.517			ultra sound
	2.507	2.454			ultra sound <i>Blade</i>

measured by:
date:

inspected by:
date:

Work Order ID 108433

108433

Page 1

October 17/13 1:30:45 PM

Item ID: D407-667-205

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Aft Crosstube

Start Date: 10/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: MLJ Date: 13-10-21 Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr Revision Nbr

D407-667-245 Rev F/DEO

100 0.00

100

DOCUMENT CONTROL

DC Memo 0.00

DAS
6

Document Control Photocopy bluefile and create labels as per PPP D407-667-205 CHG008

12/12/19

110 0.00

110

Pick Kit
Packaging

Packaging Memo 0.00

13-10-30

120 0.00

120

BENDING MACHINE - CROSSTUBES

CNC Bend 1 Memo 0.00

CNC Delta 100 Bender 1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and Folio 21

13-10-30
DGL

Work Order ID 108433***108433***

Page 2

October-17-13 1:30:45 PM

Item ID: D407-667-205

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube

Start Date: 10/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00

DAS

16

9-89

B10/31

130

QC

Memo

Quality Control

Work Order ID 108433

October-17-13 1:30:45 PM

108433

Page 3

Item ID: D407-667-205

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Aft Crosstube

Start Date: 10/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Run Start

NR1

Stop

NR2

Approvals: Process Plan: Date: Tooling: Date:

QC: Date: SPC (Y/N): Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

140

0.00

140

Crosstubes

Crosstubes

Crosstubes

Memo

0.00

***** ENSURE PROPER JIG POSITIONING BEFORE DRILLING*****
VERIFIED BY: MO *****

1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill all (3) top holes. Holes facing inboard. Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245

***** ENSURE PROPER JIG POSITIONING BEFORE DRILLING*****
VERIFIED BY: MO *****

2- Drill fwd rivet holes using drill Jig DT8787 fwd as per Dwg D407-667-245.
Note: FWD side has 3X top holes facing inboard.

3- C'sink holes as per dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

4- Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins. Drill ONLY 2 top holes ONLY plug most bottom hole to prevent accidental drilling. Drill holes and ream using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill only the top (2) holes. Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245

***** ENSURE PROPER JIG POSITIONING BEFORE DRILLING*****
VERIFIED BY: MS *****

5-Drill aft rivet holes using drill Jig DT8787 aft as per Dwg D407-667-245.

MO / MS 13/11/04

Work Order ID 108433

108433

Page 4

October-17-13 1:30:45 PM

Item ID: D407-667-205

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Aft Crosstube

Start Date: 10/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Drill only the top (2) holes.

***** ENSURE PROPER JIG POSITIONING BEFORE DRILLING*****
VERIFIED BY: MO *****

6- C'sink holes as per dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

7- Scribe tube to identify on the inner chamfer in the cuff D# and B#

8-*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***Debur
& Inspect for surface damage. Repair damage within limits as per Dwg D407-667-245

MO
ATW
13/11/04

13-11-05

150

QC5- Inspect part completeness to step on W/O 0.00

150

QC

Quality Control

Memo

0.00

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

DAS
27
9-89

13-11-06

Work Order ID 108433

108433

Page 5

October-17-13 1:30:45 PM

Item ID: D407-667-205

Accept

N9000040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Aft Crosstube

Start Date: 10/17/13

Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13

Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160		0.00							
1160									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1- CLEAN CROSSTUBE WITH WASH'N WIPE								
180									
	Outsource process - NDT per QSI038 4.1	0.00							
1180									
Outsource2	Memo	0.00							
Outsource process - NDT	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Liquid Penetrant Inspection as per QSI 0380								
	Issue P/O 21974 LPI as per ASTM 1417								
	Level 2 Attach copy of NDT results to work order								
190									
1190									
Packaging		0.00							
Packaging	Memo	0.00							
Packaging	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Ensure copy of NDT results attached to work order.								

13-11-7

CZ 13/11/08 @

B 13/11/08 @

Work Order ID 108433***108433***

Page 6

October-17-13 1:30:45 PM

Item ID: D407-667-205

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube

Start Date: 10/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200 *200* QC Quality Control	QC5- Inspect part completeness to step on W/O Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***	0.00 0.00				1			WJW 13-11-08
204 *204* HandFXtube Hand Finishing Crosstubes	HandFXtube Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** 1- PRESSURE WASH AND THEN USE WASH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION	0.00 0.00				1	0	0	AB 13-11-7
206 *206* QC Quality Control	QC7-Inspect Chemical Conversion Coat Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***	0.00 0.00				1			WJW 13-11-08

Work Order ID 108433

108433

Page 7

October-17-13 1:30:45 PM

Item ID: D407-667-205

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Item Name: Aft Crosstube

Stop ***NS2***

Start Date: 10/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
210									
SprayPaint	Memo	0.00							
Spray Painting	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Mask underside of crosstube as shown								
	1-Prime inside and outside crosstube as per DEO D407-667-245 and QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME: 126873								
	Start Time: 8:00								
	Finjsh Time: 8:30								
	Clear: 126566								
	PAINT: 127534								
	Start Time: 6:15								
	Finish Time: 7:00								
220	QC14- Inspect Spray Paint	0.00							
220									
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								

13-11-30

13-12-05

Work Order ID 108433***108433***

Page 8

October-17-13 1:30:45 PM

Item ID: D407-667-205

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube

Start Date: 10/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00							
230	Crosstubes					1	0	0	12
Crosstubes		0.00							13-12-5
Crosstubes	Memo 1- Install chafing shield as per DEO D407-667-245. Top holes should be facing up. A/R Proseal 890 Batch: <u>126855</u> EXP: <u>5/14</u> 2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe 3- Install support with Scotch-Weld DP460 and install clamps as per DEO Dwg D407-667-245 using installation jig DT9025. Torque clamps as per dwg A/R Scotch-Weld DP460 Batch: <u>126328</u> EXP: <u>7/14</u> ***LET CURE FOR 24 HOURS*** CURE TIME: START: <u>6:45</u> FINISH: <u>8:00</u> 4- Install nut plates as per Dwg D407-667-245. Touch-up rivet heads with Imron paint.								

Work Order ID 108433

108433

Page 9

October-17-13 1:30:46 PM

Item ID: D407-667-205

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Aft Crosstube

Start Date: 10/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

240 QC5- Inspect part completeness to step on W/O 0.00

240

QC Memo 0.00

Quality Control ***RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURE FOR 24HOURS AS PER DWG DEO***

DAS 05 13-12-18

250 Pick Kit 0.00

250

Packaging Memo 0.00

Packaging

DAS 33 13-12-18
3 9-89

260 QC4- 100% Inspect kits for completeness 0.00

260

QC Memo 0.00

Quality Control

DAS 6 13/12/19

Work Order ID 108433***108433***

Page 10

October-17-13 1:30:46 PM

Item ID: D407-667-205

Accept

N900040100Setup Start ***NS1***

Revision ID:

Item Name: Aft Crosstube

Stop ***NS2***

Start Date: 10/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date:

Run Start ***NR1***

QC: Date: SPC (Y/N): Date:

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
270		0.00							
270	Packaging					1		DAS 6 9-89	13/12/11
Packaging	Memo	0.00							
Packaging	Identify and in kanban rack Location: <u>113</u>								
280	QC21- Final Inspection - Work Order Release	0.00							
280									
QC	Memo	0.00							
Quality Control									

[Signature] 13/12/30
MLS 13-12-23

Picklist Print

October-17-13 1:30:44 PM

Page 1 / 5

Work Order ID: 108433
Parent Item: D407-667-205
Parent Item Name: Aft Crosstube

Start Date: 10/17/13

Required Date: 10/17/13

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:C 05.09.02 Add holes for compatibility with Bell SkidtubesKJ/JLM
IPP Rev:D Added Magnobond,Rubber Cushion & Clamps 07-02-19 JLM

****CHANGE TO CHG 005 - IF USING D2894-1 B35578 OR GREATER****

IPP Rev:E 08-05-22 add comment in seq. 6 and QC15 and QC5 DD verified by:EC

IPP Rev:F 08-06-12 add comment in seq. 24 DD verified by:EC

IPP Rev:G 08-08-19 revE as per dwg DD verified by:EC

IPP Rev H 09.01.06 ECN 08-562 EC verified by:DD IPP Rev:I 10.04.07 revise route seq.

in bom DD verified by:JLM IPP Rev J 11.04.26 removed abrasion strip ecn 11-551 EC verified

by:DD

IPP REV:K 11.10.03 DEO D407-667-245-

F-2 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
ANS-10A BOLT DAS 6 9-89		Purchased	No			250	Each	405.0000	10	10 127432		DAS 33 9-89	DAS 31 9-89
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				GA		50							
				122800		50							
				st503		355							
				M126180		355							
ANS-32A Bolt DAS 6 9-89		Purchased	No			250	Each	287.0000	4	4 127363		DAS 33 9-89	DAS 31 9-89
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				ST337		282							
				124215		282							
				ST350A		5							
				124805		5							
ANS-33A Bolt DAS 6 9-89		Purchased	No			250	Each	62.0000	4	4 126176		DAS 33 9-89	DAS 31 9-89
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				st503		62							
				m126176		46							
				m126474		16							

13-12-18

Picklist Print

October-17-13 1:30:44 PM

Page 2

Work Order ID: 108433
Parent Item: D407-667-205
Parent Item Name: Aft Crosstube

Start Date: 10/17/13

Required Date: 10/17/13

Start Qty: 1.00

Required Qty: 1.00

D2873-043
Nut Plate Assembly

Manufactured No

230 Each 70.0000

2 2

As 13-12-2

Location

Loc Qty

Loc Code

LG052

70

100708

2

103456

25

104871

40

72644

2

84386

1

D2873-045
Nut Plate Assembly

Manufactured No

230 Each 72.0000

2 2

As 13-12-2

Location

Loc Qty

Loc Code

LG052

72

100418

1

100707

2

103569

29

104870

40

D2894-1
2.750 Support

Manufactured No

230 Each 15.0000

1 1

As 13-12-5

Location

Loc Qty

Loc Code

LG052

15

103950

9

105623

6

D3190-1
Chaffing Shield

Manufactured No

230 Each 55.0000

2 2

As 13-12-5

Location

Loc Qty

Loc Code

LG

12

104822

12

LG053

41

100615

1

105834

37

75947

3

LG055

2

72576

2

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Shop Packet Print

Page 2

Picklist Print

Page 3

October-17-13 1:30:44 PM

Work Order ID: 108433
 Parent Item: D407-667-205
 Parent Item Name: Aft Crosstube
 D3595-063-450
 Rubber Cushion

Start Date: 10/17/13

Required Date: 10/17/13

Start Qty: 1.00

Required Qty: 1.00

Manufactured No

230

Each

80.7000

2

2

AS 13-12-5

Location	Loc Qty	Loc Code
FG	15	
88422	5	
94274	10	
LG	11	
105054	11	
LG050	54	
105557	27	
106584	27	
LG051	0.7	
99357	0.7	

D407-667-205TRN
 Crosstube Turning Detail

Manufactured No

110

Each

5.0000

1

1

Location	Loc Qty	Loc Code
LG	2	
107536	1	
104820	1	
104821	1	
LG003	3	
105223	1	
105224	1	
105225	1	

3-10-30 DGL

MS20601-AD4W8
 RIVET

Purchased No

230

Each

520.0000

14

14

AS 13-12-2

Location	Loc Qty	Loc Code
ST311	494	
124102	70	
124395	24	
M126637	400	
ST318	26	
M126084	26	

15 → 1 scrap

October-17-13 1:30:45 PM

Shop Packet Print

Page 3

Picklist Print

October-17-13 1:30:45 PM

Page 4

Work Order ID: 108433
 Parent Item: D407-667-205
 Parent Item Name: Aft Crosstube

Start Date: 10/17/13

Required Date: 10/17/13

Start Qty: 1.00

Required Qty: 1.00

MS21042153

Nut

Purchased

No

250

Each

866.0000

4 4 888 13-12-18

Location

Loc Qty

Loc Code

ST314

35

125654

35

ST506

1

123900

1

st507

830

125535

830

125535

MS21920-22

Clamp

Purchased

No

230

Each

74.0000

4 4 A 13-12-5

Location

Loc Qty

Loc Code

LG050

74

125487

5

M126420

19

M126637

50

4

MS21920-25

Clamp

Purchased

No

230

Each

87.0000

2 2 A 13-12-5

Location

Loc Qty

Loc Code

FG

2

120920

2

LG050

85

M126491

45

M126862

40

2

October-17-13 1:30:45 PM

Shop Packet Print

Page 4

Picklist Print

October-17-13 1:30:45 PM

Page 5

Work Order ID: 108433

Parent Item: D407-667-205

Parent Item Name: Aft Crosstube

Start Date: 10/17/13

Required Date: 10/17/13

Start Qty: 1.00

Required Qty: 1.00

NAST149D0563J
Washer

Purchased

No

230

Each

5,202.0000

18

18

DAS
33
9-89

13-12-18

DAS
6
9-89

Location

Loc Qty

Loc Code

ST294

111

123248

42

123355

12

m125807

57

ST298

91

122452

91

ST510a

5000

m126319

5000

126319

DAS
89

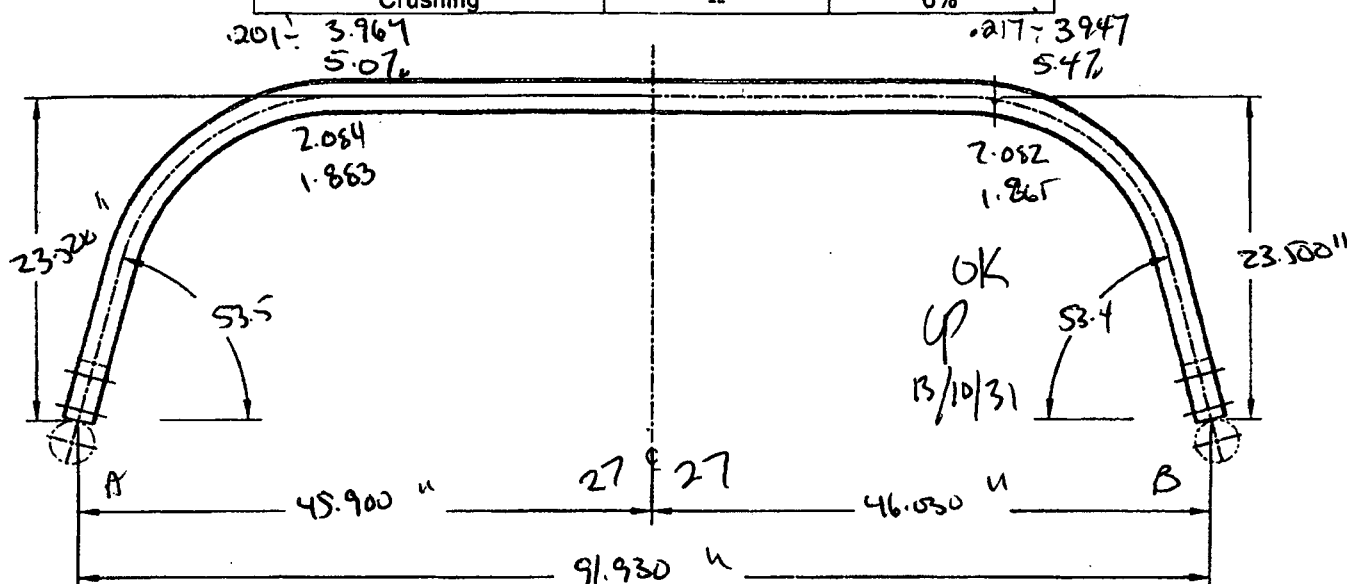
October-17-13 1:30:45 PM

Shop Packet Print

Page 5

DART AEROSPACE LTD		Work Order:	108433
Description: Crosstube High Aft (407)		Part Number:	D407-667-205
Inspection Dwg: D407-667-245		Rev: F	Page 1 of 1

Required Dimension	Min	Max
Height	23.39	23.65
1/2 Span	45.79	46.05
Angle	54	56
Total Span	91.58	92.100
Bending Passes	6	--
Crushing	--	6%

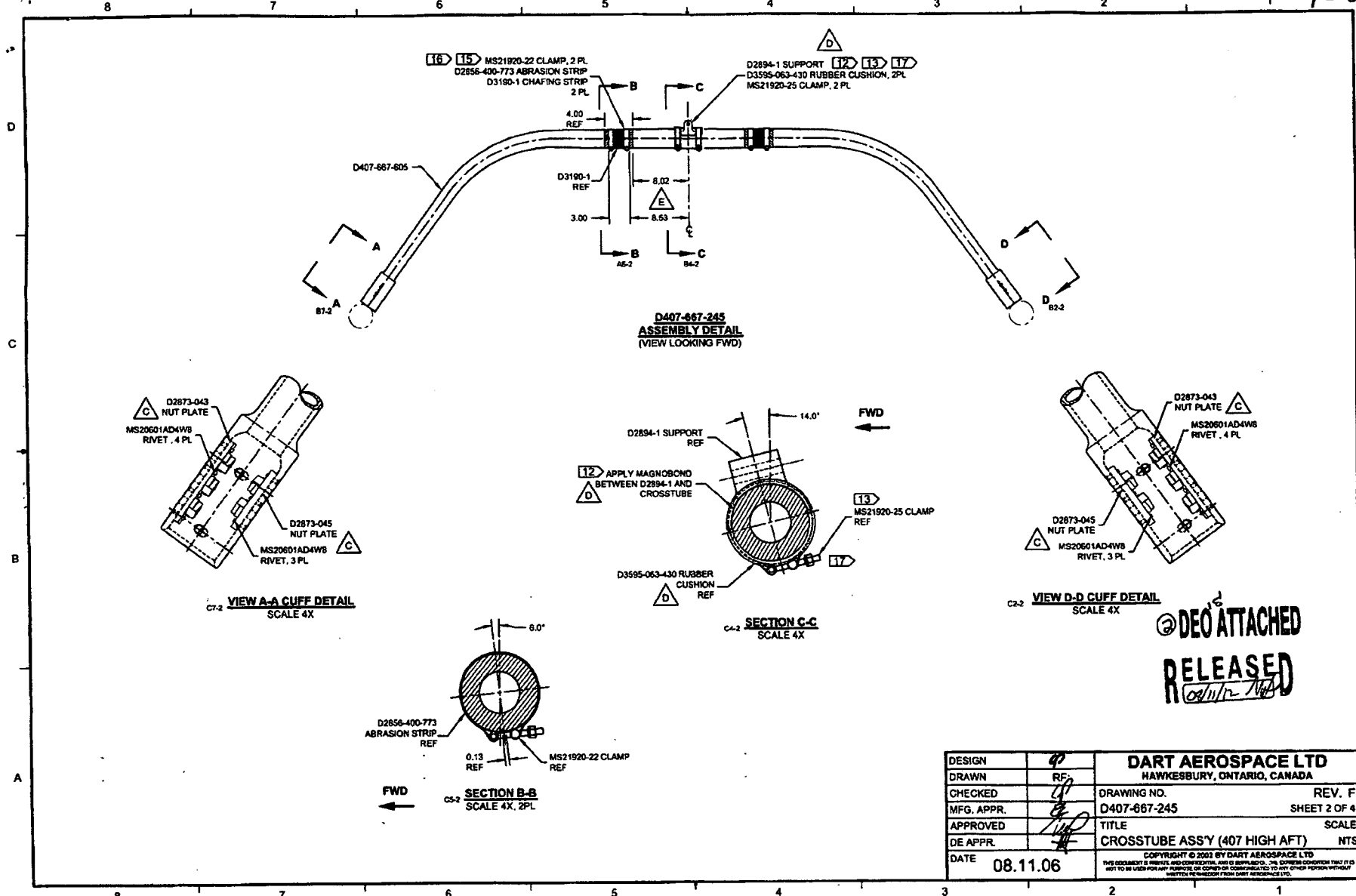


	Side A	Side B
Bending Passes	27	27
Crushing	5.07%	5.47%
Comments		
Side A = 5.07% crushing @ 27 Passes		
Side B = 5.47% crush @ 27 Passes		

QC15 Inspection	DAS
Date	16 13/10/31

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.06.22	Dwg Rev updated	KJ	
C	11.08.22	Dimensions updated	KJ	
D	11.09.30	Dimensions updated	KJ	
E	12.04.16	Added bending, crushing dimensions	KJ	

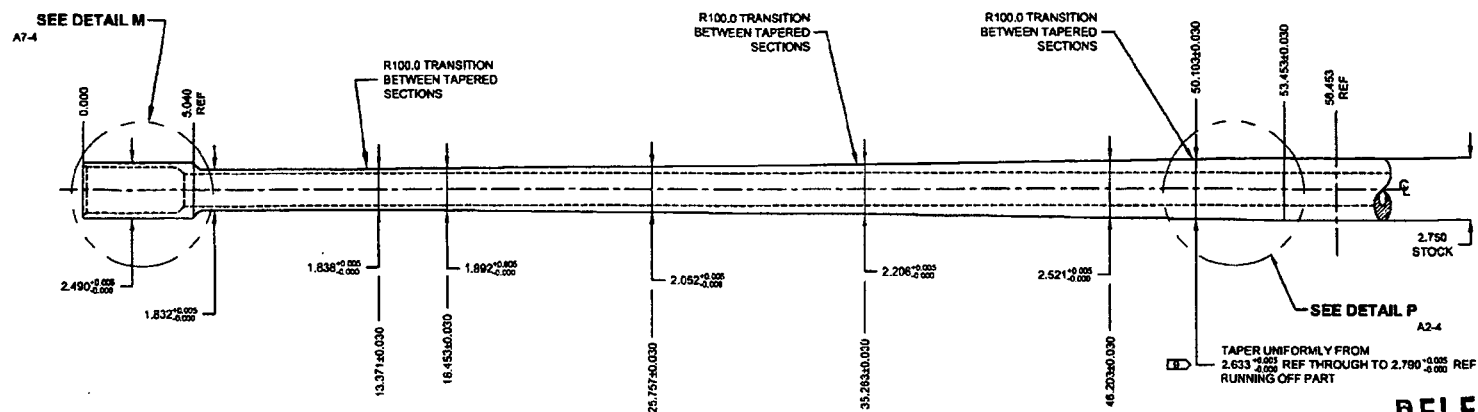
108433



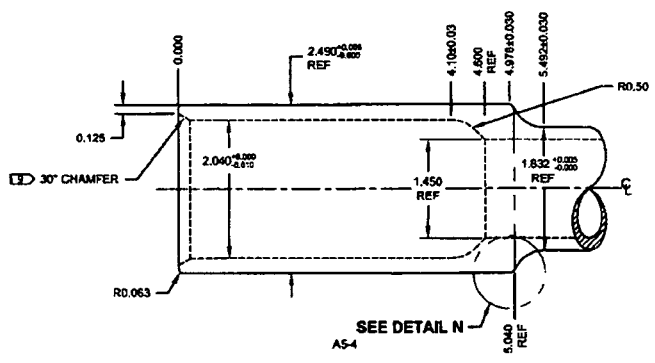
DEO ATTACHED
RELEASED
08/11/06

DESIGN	407	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	407	DRAWING NO.	REV. F
MFG. APPR.	407	D407-667-245	SHEET 2 OF 4
APPROVED	407	TITLE	SCALE
DE APPR.	407	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2003 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED TO THE CUSTOMER UNDER THE CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR DISSEMINATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

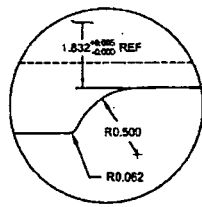
108433



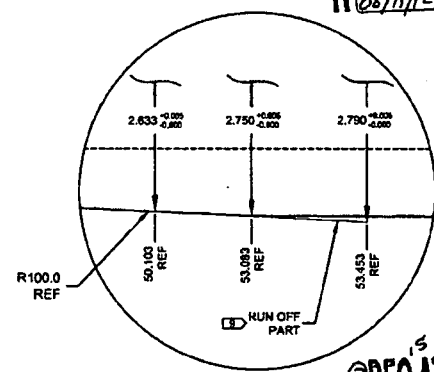
D407-667-245 MACHINING DETAIL



DETAIL M: CROSSTUBE CUFF
SCALE 3X



DETAIL N: CUFF TRANSITION
SCALE 2X

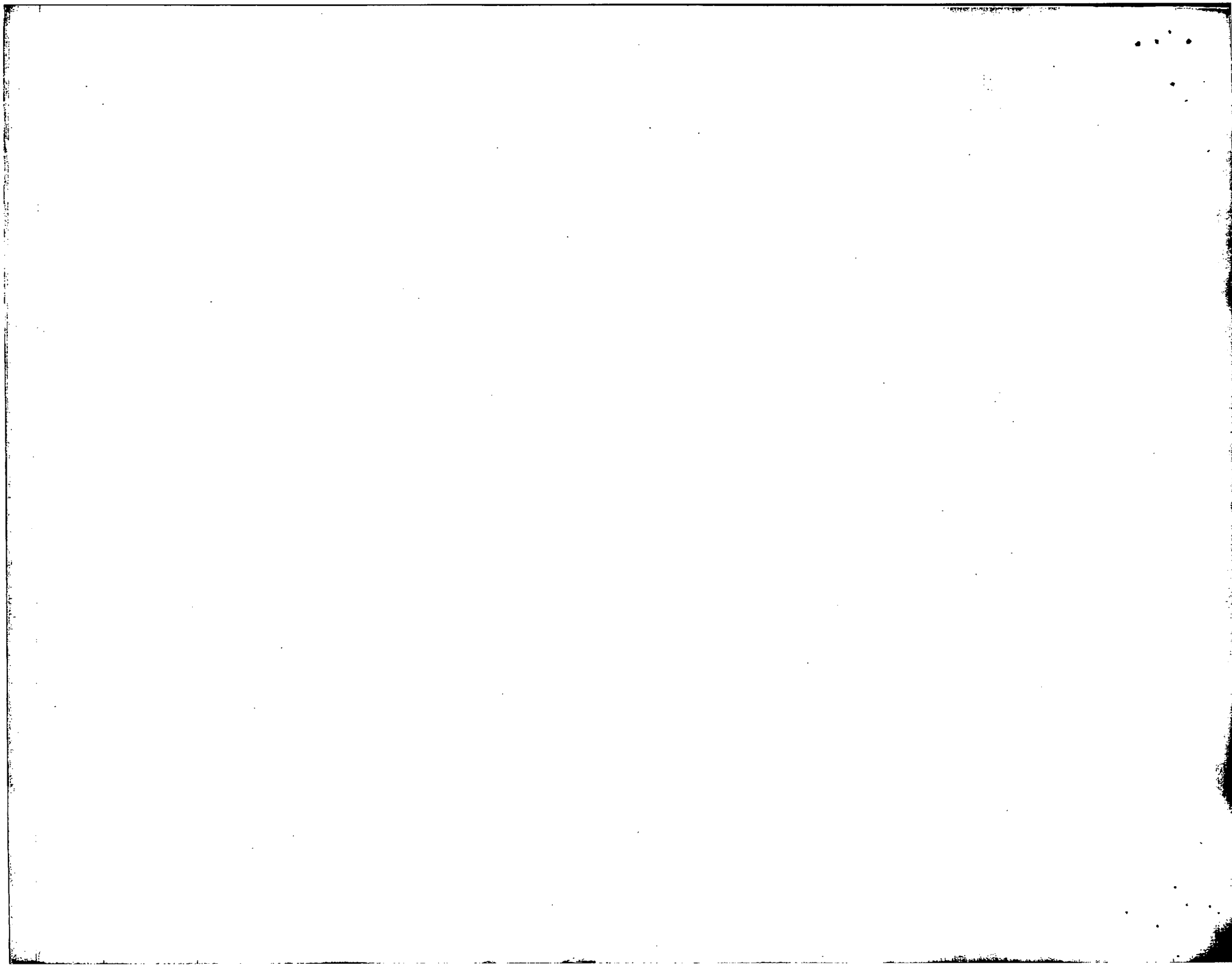


DETAIL P: TAPER RUN-OFF
NOT TO SCALE

RELEASED
08/11/12 JMD

DEO'S ATTACHED

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. F
MFG. APPR.	RF	D407-667-245	SHEET 4 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASSY (407 HIGH AFT)	NTS
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108433

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASS'Y (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D407-667-245-F-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN P	CHECKED ASS	MFG. APPR. E	APPROVED MP		DE APPR. H		
DATE 11.09.07	DATE 11.09.19	DATE 11.09.19	DATE 11.09.19		DATE 11.09.19		

PURPOSE:

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

CHANGE:

IS:

Item	Qty	Part Number	Description
	-245		
12	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD

WAS:

12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
----	-----	----------------	---

NOTE 12 & 17, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

WAS:

- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-09-29
MP



LIQUID PENETRANT TEST REPORT

P- 122540

PAGE 1 OF 1

CLIENT Dart Aerospace DATE Nov 7 2013 TIME AM ☒ PM ☐
ATTENTION Chantale, Linda, Andy ACUREN JOB NO. 188-13-C0393
ADDRESS 1270 Aberdeen St POWO No. 21994
New Kesbury, on WORK LOCATION As Address
ACCEPTANCE STD. ASTM 1417/AS1022 REV./DATE 2009
PROJECT Pt-wet Fluorescent Liquid Penetrant Inspection
ITEM(S) EXAMINED - See Below

JOB DESCRIPTION PROCEDURE No. LT-002 REV./DATE 2009 TECHNIQUE No. LT-003 REV./DATE 2009
PART NO. MATERIAL Aluminium THICKNESS -
SCOPE Performed a wet Fluo L.P.I on 100% of the external surface only on item mentioned below

TEST DETAILS
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND Magna-Flux BLACK LIGHT S/N 3790 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT Z6-67 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER #10 MINIMUM DRY TIME >10 MIN. OTHER
DEVELOPER SKD-S2 MINIMUM DWELL TIME 30 MIN. LIGHT METER S/N 1098866 CAL DUE DATE May 2014
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)		ACCEPT	REJECT
1	crash tube mid aft w.o ID 108743	✓	
2	crash tube mid aft w.o ID 108744	✓	
3	Aft crash tube w.o ID 108743	✓	
4	Aft crash tube w.o ID 108702	✓	
5	Aft crash tube w.o ID 108701	✓	
6	Aft crash tube w.o ID 108702	✓	
7	Aft crash tube w.o ID 108705	✓	
8	Aft mid high crash tube w.o ID 108707	✓	
9	Aft mid high crash tube w.o ID 108707	✓	
No Relevant Indication was detected As per applicable standard at the time of inspection.			
			Item ID 0-206-667-207RL Item ID 0-206-667-207RL Item ID 0-407-667-205 Item ID 0-407-667-205 Item ID 0-407-667-205 Item ID 0-407-667-205 Item ID 0-407-667-205 Item ID 0-206-667-207RL (208/11/13/14, Blue) Item ID 0-206-667-207RL (208/11/13/14, Blue)

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.
Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES
CLIENT REPRESENTATIVE Andy Sheldon Asheldon DTR # E-07954
TECHNICIAN (SIGNATURE): Alexandre Michard
NAME (PRINT): Alexandre Michard 1st TECHNICIAN 2nd TECHNICIAN
CGSB LEVEL 2 SNT LEVEL 2 CGSB LEVEL 2 SNT LEVEL 2
CGSB REG. NO. 101418 CGSB REG. NO. 101418

Work Order ID 108433

October-17-13 1:30:45 PM

108433

Page 1

Item ID: D407-667-205

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube

Start Date: 10/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: *MLJ*

Date: *13-10-21*

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description
Draw Nbr	Revision Nbr
D407-667-245	Rev F/DEO
100	
100	DOCUMENT CONTROL
DC	Memo
Document Control	Photocopy bluefile and create labels as per PPP D407-667-205 CHG008
110	
110	Pick Kit
Packaging	Packaging
Packaging	Memo
120	
120	BENDING MACHINE - CROSSTUBES
CNC Bend 1	Memo
CNC Delta 100 Bender	1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and Folio 21

Set Up/
Run Hours

Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp

JD

MLJ 13-12-19

13-10-30 DEL

13-10-30 DEL

Work Order ID 107536

107536

Page 1

September-27-13 12:31:27 PM

Item ID: D407-667-205TRN

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Crosstube Turning Detail

Start Date: 9/27/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/11/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: ML5

Date: 13-09-27

Tooling:

Date:

Run Start *NR1*

QC:

Date:

SPC (Y/N):

Date:

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

D407-667-245

Rev F

100

0.00

100

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs D78531 on both ends as per Folio FA248

2-Turn first side as per Folio FA248

3-Blend transition lines only, **do not sand whole tube**

FOLIO REV: AA

DWG REV: E

*Use mill bastard file, brush file repeatedly with file card.

*Do not use sandpaper coarser than 320 grit.

1 ϕ KK
13-10-03

110

QC1- Inspect dimensions to dimension sheet

0.00

110

QC

Memo

0.00

Quality Control

1 ϕ KK
13-10-03

September-27-13 12:31:27 PM

Page 2

0.00

1 ϕ ————— Kc
13-10-03

1 ~~0~~ KC
13-10-03

Work Order ID 107536

September-27-13 12:31:27 PM

107536

Page 3

Item ID: D407-667-205TRN

Accept

N900040100

Setup Start

NS1

Revision ID:

Item Name: Crosstube Turning Detail

Stop

NS2

Start Date: 9/27/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/11/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

NR1

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140	QC8- Inspect parts - second check	0.00							
140									
QC	Memo	0.00							
Quality Control									
145		0.00							
145									
Crosstubes	Memo	0.00							
Crosstubes	Grind off circumferential machining marks longitudinally.								
150		0.00							
150									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	1- PRESSURE WASH X-TUBE INSIDE AND OUT								
	2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE								

TW 13-10-16

- de 13/10/16

Rm 13-10-24

September-27-13 12:31:27 PM

Page 4

Setup Start *NS1*

Stop *NS2*

Customer:

Run Start *NR1*

Stop *NR2*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

160	QC5- Inspect part completeness to step on W/O	0.00
-----	---	------

QC	Memo	0.00
----	------	------

170 0 00

Packaging	Memo	0.00
-----------	------	------

Packaging Identify and stock in kanban rack Location: **LG**

180	QC21- Final Inspection - Work Order Release	0.00
-----	---	------

QC	Memo	0.00
----	------	------

Quality Control

JA / Rm 13/10/29

Picklist Print

September-27-13 12:31:31 PM

Page 1 / 1

Work Order ID: 107536

107536

Parent Item: D407-667-205TRN

D407-667-205TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 9/27/13

Required Date: 10/11/13

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A 08-03-06 new issue DD verified by:ec
IPP Rev B 08.04.02 Removed polish EC verified by: DD
IPP Rev:C 08-08-19 revE as per dwg DD verified by:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D6011-115

Manufactured No

120

Each

34.0000

1

1

D6011-115

**

Crosstube Material

LocationLoc QtyLoc Code

LG015

34

12

3

19

677980
69802
75639

_____ 1 man. 6/13/10/01

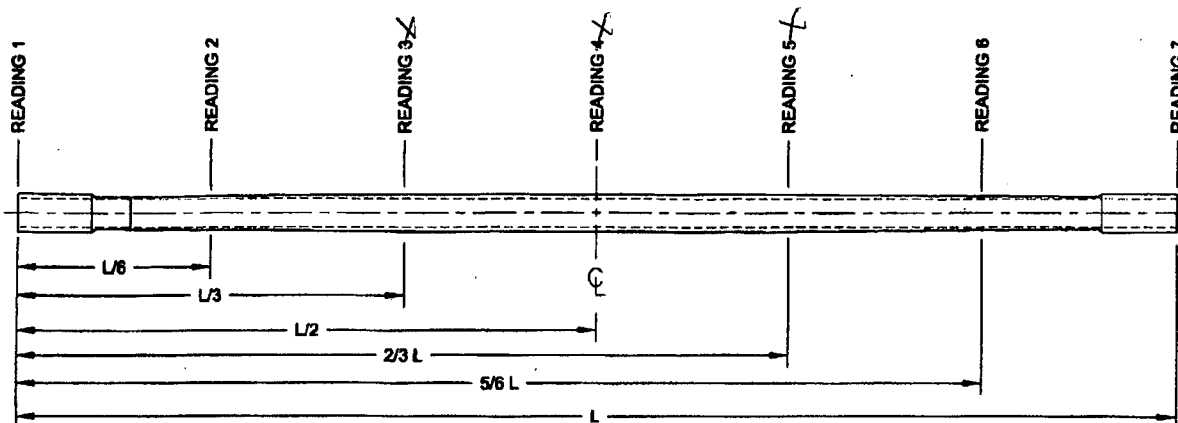
DART AEROSPACE LTD		Work Order:	<i>107536</i>
Description: Crosstube Assembly		Part Number:	D407-667-245
Inspection Dwg: D407-667-245 Rev: F		Page 1 of 2	

FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.490	+0.005/-0.000	<i>2.492</i>	<i>/</i>		<i>VERN</i>	<i>CNC 0%</i>
	1.832	+0.005/-0.000	<i>1.835</i>	<i>/</i>			
	1.838	+0.005/-0.000	<i>1.841</i>	<i>/</i>			
	1.892	+0.005/-0.000	<i>1.895</i>	<i>/</i>			
	2.052	+0.005/-0.000	<i>2.057</i>	<i>/</i>			
	2.206	+0.005/-0.000	<i>2.209</i>	<i>/</i>			
	2.521	+0.005/-0.000	<i>2.526</i>	<i>/</i>			
	2.633	+0.005/-0.000	<i>2.636</i>	<i>/</i>			
	4.10	+/-0.030	<i>4.10</i>	<i>/</i>			
	4.978	+/-0.030	<i>4.980</i>	<i>/</i>			
	2.040	+0.000/-0.010	<i>2.034</i>	<i>/</i>			
	0.125	+/-0.010	<i>.125</i>	<i>/</i>			
	R0.063	+/-0.010	<i>.063</i>	<i>/</i>		<i>R6</i>	<i>—</i>
	R0.500	+/-0.010	<i>.500</i>	<i>/</i>		<i>R6</i>	<i>—</i>
	2.490	+0.005/-0.000	<i>2.491</i>	<i>/</i>		<i>REVERN</i>	<i>CNC 0%</i>
	1.832	+0.005/-0.000	<i>1.832</i>	<i>/</i>			
SIDE B	1.838	+0.005/-0.000	<i>1.838</i>	<i>/</i>			
	1.892	+0.005/-0.000	<i>1.892</i>	<i>/</i>			
	2.052	+0.005/-0.000	<i>2.053</i>	<i>/</i>			
	2.206	+0.005/-0.000	<i>2.206</i>	<i>/</i>			
	2.521	+0.005/-0.000	<i>2.526</i>	<i>/</i>			
	2.633	+0.005/-0.000	<i>2.636</i>	<i>/</i>			
	4.10	+/-0.030	<i>4.10</i>	<i>/</i>			
	4.978	+/-0.030	<i>4.986</i>	<i>/</i>			
	2.040	+0.000/-0.010	<i>2.035</i>	<i>/</i>			
	0.125	+/-0.010	<i>.125</i>	<i>/</i>			
	R0.063	+/-0.010	<i>.063</i>	<i>/</i>		<i>R6</i>	<i>—</i>
	R0.500	+/-0.010	<i>.500</i>	<i>/</i>		<i>R6</i>	<i>—</i>
	112.91	+/-0.020	<i>112.91</i>	<i>/</i>		<i>TAPE</i>	<i>ED-17</i>

DART AEROSPACE LTD	Work Order: 107536
Description: Crosstube Assembly	Part Number: D407-667-245
Inspection Dwg: D407-667-245 Rev: F	Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE	
	w1	w2	w3	w4			
READING 1 L= 0"	237	236	235	237	.002		
READING 2 L= 18.8	260	247	238	263	.025	Top	Bottom
READING 3 L= 37.6	433	392	409	677	.041	0.409	0.422
READING 4 L= 56.4	659	653	671	417.672	.024	0.672	0.656
READING 5 L= 75.2	414	417	423	242.417	.009	0.411	0.405
READING 6 L= 94.08	238	244	252	237.242	.014		
READING 7 L= 112.91	232	231	232	231	.001		

Calibration Result

Actual Block Thickness: 100-750

Sitiescan 250 Measured Thickness: 100-750

Measured by: LC	Audited by: JW	Preliminary Approval:
Date: 13-10-03	Date: 13-10-16	Date:

Rev	Date	Change	Revised by	Approved
A	04.04.21	New Issue (P/O D407-667-205)	KJ/RF	
B	06.03.09	Dwg Rev updated	KJ/JLM	
C	06.03.30	Tolerance revised for 4.978 dimension	KJ/JLM	
D	07.02.19	Dwg Rev updated	KJ/JLM	
E	09.05.20	Dwg Rev updated	KJ	
F	12.06.04	Wall thickness form added	KJ	

Item	QTY	PART NUMBER	DESCRIPTION
	-245		
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D6011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947- 100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6011-115
FINISHED LENGTH = 112.81±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON
INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 27.7 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND
6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO
PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE
SUPPORT.
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS.
ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF
CROSSTUBE, PER QSI 035.
- 16) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE
OPPOSITE D2894-1 SUPPORT.
- 17) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

107536 MLW
13-09-27

DEO ATTACHED

RELEASED
08/11/2006

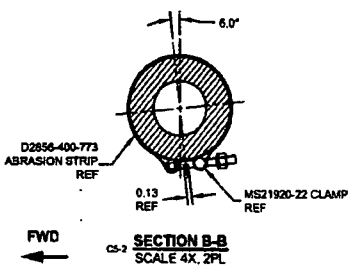
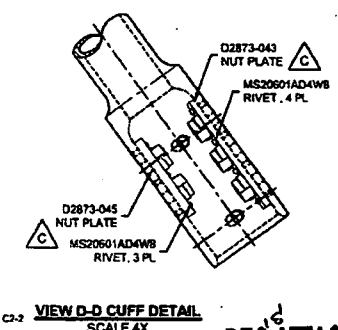
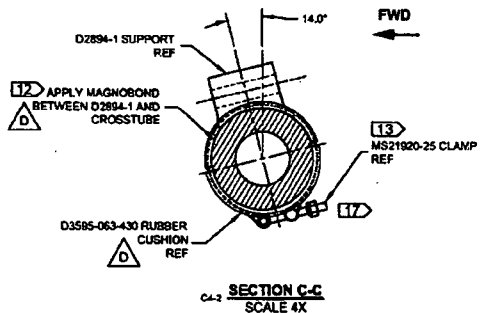
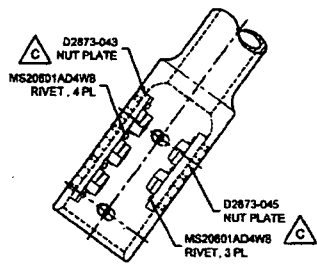
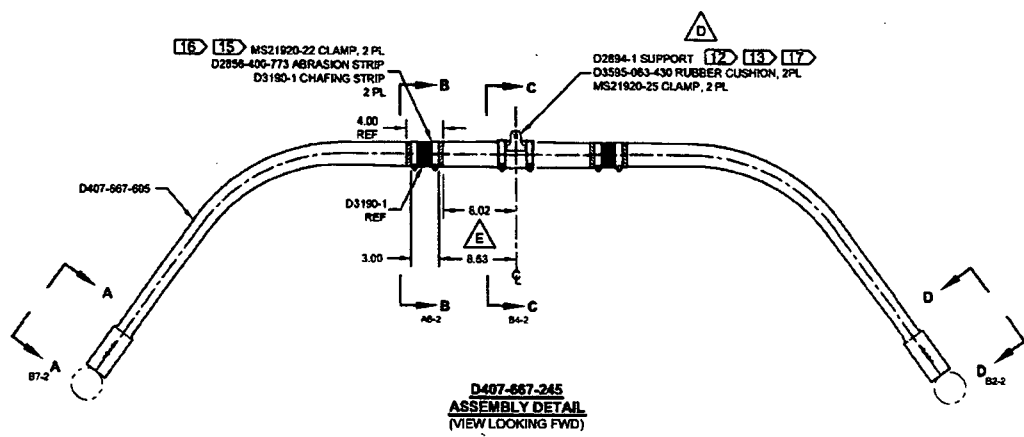
F	REFORMAT NOTES TO NEW STANDARDS (ZN 88-1); RELOCATED FLAG # 6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C8-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: FARR08-21 AND ECH#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN	9		
DRAWN	RF		
CHECKED	CP		
MFG. APPR.	CP		
APPROVED	CP		
DE APPR.	CP		
DATE	08.11.06		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. REV. F
D407-667-245 SHEET 1 OF 4
TITLE SCALE
CROSSTUBE ASSY (407 HIGH AFT) NTS

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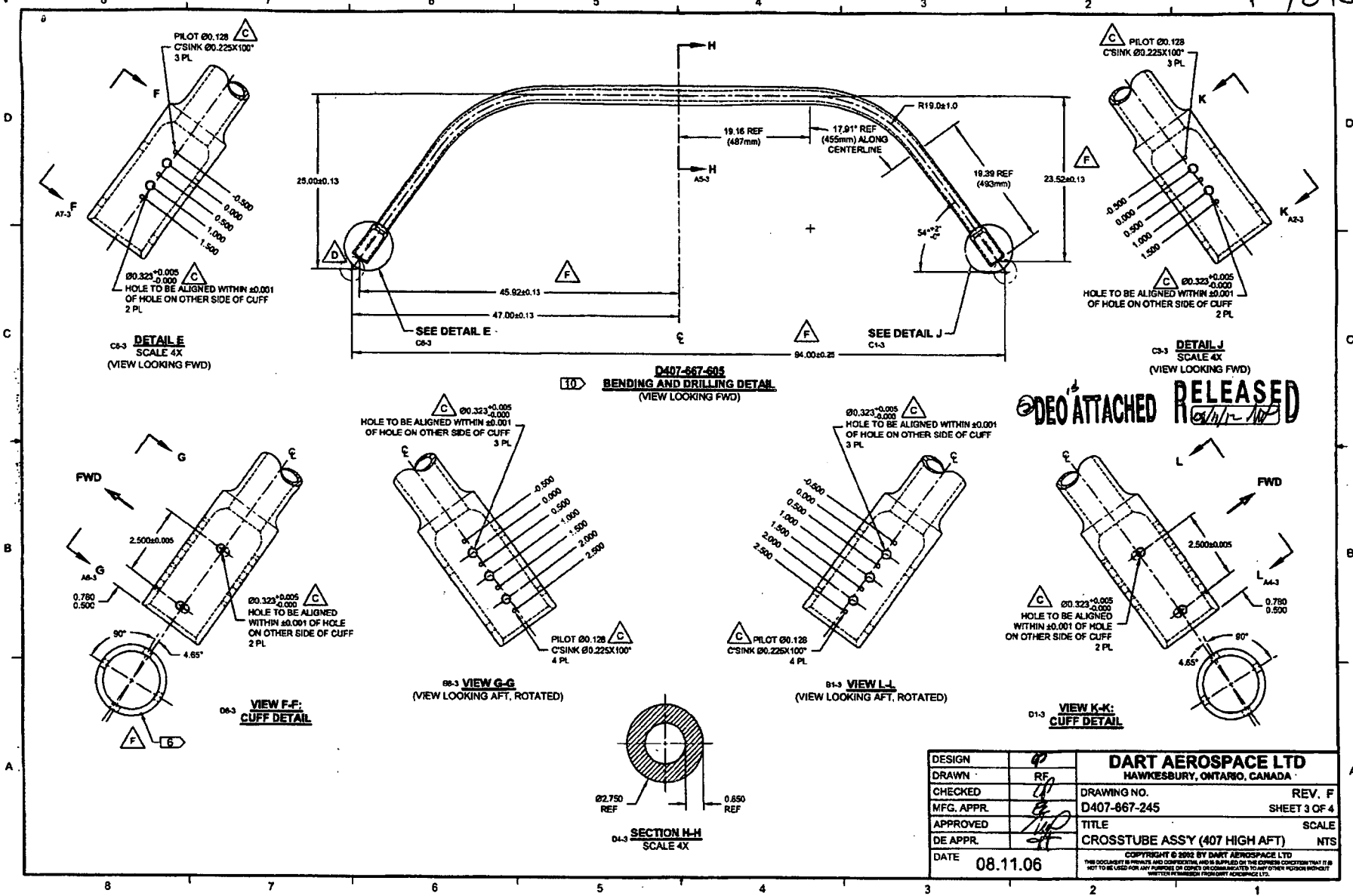
107536



**@ DEO ATTACHED
RELEASED**

DESIGN	9	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	LF	DRAWING NO.	REV. F
MFG. APPR.	EF	D407-667-245	SHEET 2 OF 4
APPROVED	MF	TITLE	SCALE
DE APPR.	MF	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
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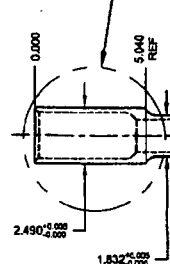
DEO ATTACHED RELEASE

DESIGN	RF	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	RF	DRAWING NO. REV. F
MFG. APPR.	RF	D407-667-245 SHEET 3 OF 4
APPROVED	RF	TITLE SCALE
DE APPR.	RF	CROSSTUBE ASSY (407 HIGH AFT) NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD

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107536

SEE DETAIL M
A7-4



R100.0 TRANSITION
BETWEEN TAPERED
SECTIONS

R100.0 TRANSITION
BETWEEN TAPERED
SECTIONS

R100.0 TRANSITION
BETWEEN TAPERED
SECTIONS

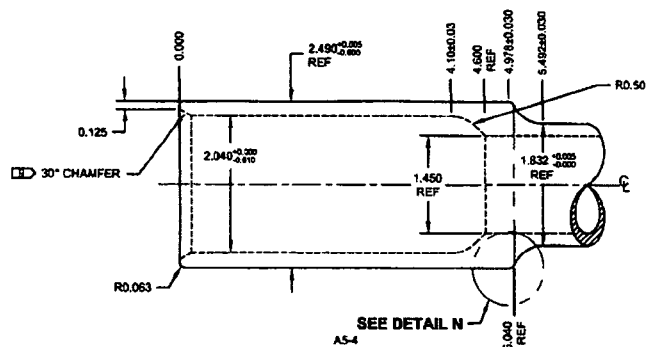
SEE DETAIL P
A2-4

TAPER UNIFORMLY FROM
2.633 (+0.005/-0.000) REF THROUGH TO 2.790 (+0.005/-0.000) REF
RUNNING OFF PART

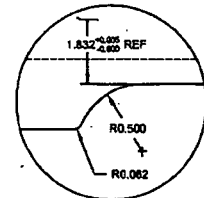
D407-667-245 MACHINING DETAIL

2.523/2.523

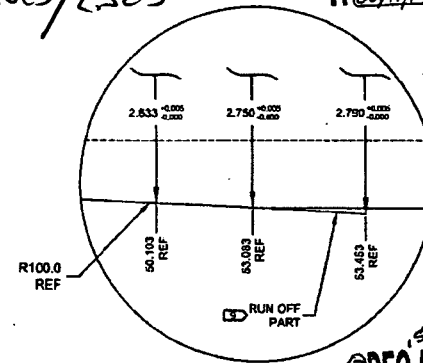
RELEASED
08/11/12



D8-4 DETAIL M: CROSSTUBE CUFF
SCALE 3X



B8-4 DETAIL N: CUFF TRANSITION
SCALE 2X



C1-4 DETAIL P: TAPER RUN-OFF
NOT TO SCALE

DEO'S ATTACHED

DESIGN	40	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	40	DRAWING NO.	REV. F
MFG. APPR.	40	D407-667-245	SHEET 4 OF 4
APPROVED	40	TITLE	SCALE
DE APPR.	40	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
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DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D407-667-245-F-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.			
DATE 11.04.08	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12			

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

Item	Qty	Part Number	Description
	-245		
3	0	D2856-400-773	ABRASION STRIP

WAS:

3	2	D2856-400-773	ABRASION STRIP
---	---	---------------	----------------

NOTES 2 AND 16, SHEET 1 ARE AMENDED AS FOLLOWS:

IS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND
PAINT OUTSIDE PER DART QSI 005 4.2
REMOVE MASKING AND APPLY CLEAR COAT
- 15) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3190-1
CHAFING SHIELDS AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL
PROSEALED D3190-1 CHAFING SHIELDS ONTO CROSSTUBE BY APPLYING A THIN COAT
OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 REF GAP ON BOTTOM SIDE OF
CROSSTUBE PER QSI 035.

RELEASED
2011-04-18

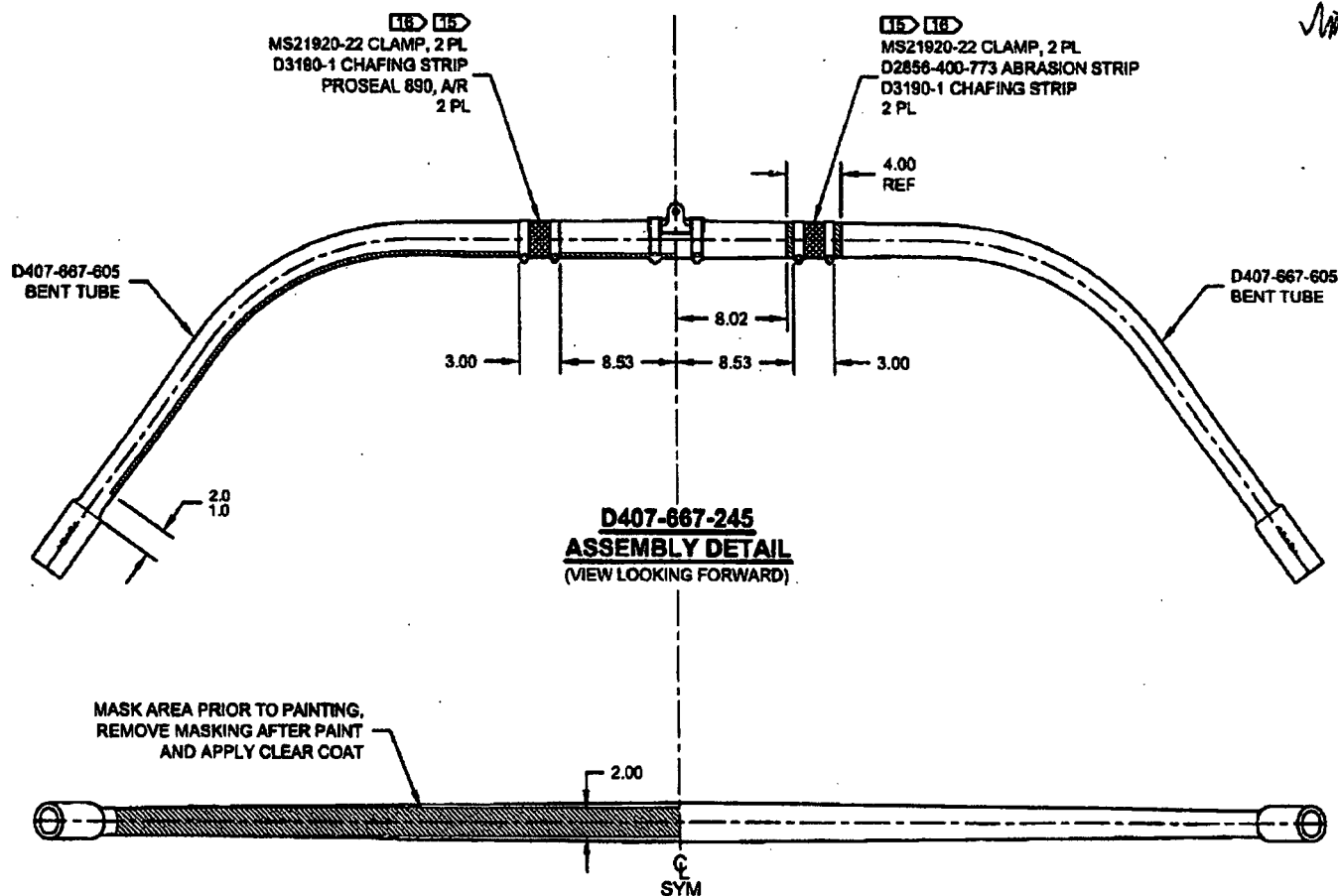
107536

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D407-667-245-F.1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN	CHECKED <i>UP</i>	MFG. APPR. <i>E</i>	APPROVED <i>WP</i>	DE APPR. <i>WP</i>		
DATE 11.04.08	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

IS:

WAS:

RELEASE
2011-04-18
WP



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107536

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASS'Y (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D407-667-245-F-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN EP	CHECKED ASS	MFG. APPR. E	APPROVED MP		DE APPR. #1		
DATE 11.09.07	DATE 11.09.19	DATE 11.09.19	DATE 11.09.19		DATE 11.09.19		

PURPOSE:

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

CHANGE:

IS:

Item	Qty -245	Part Number	Description
12	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD

WAS:

12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
----	-----	----------------	---

NOTE 12 & 17, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

WAS:

- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-09-29
MD

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____

Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☒ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width:100%; font-size: small;"> <tr> <td>Skid-tube ☐</td> <td>Cross tube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>				Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																																	
Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐																																																																		
Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐																																																																		
Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐																																																																		
Large Fab ☐	Composite ☐	Supplier ☐																																																																			
Date : 15/10/17	Step #:	QTY Effective :		MRB (QSI042) Approval DAS 12 9-89 15/10/17																																																																	
Description Work Order Deviation			Disposition																																																																		
Acceptable to put a bead of process 890 around support and chafing shield.			Acceptable, minor deviation																																																																		
			Completed By DAS 41 9-89 15-11-11																																																																		
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